

VOLTAGE CONTROLLED OSCILLATOR CAPABLE OF
LINEAR OPERATION AT VERY LOW FREQUENCIES

ABSTRACT OF THE DISCLOSURE

5 There is disclosed a voltage controlled oscillator (VCO) that receives $+V(IN)$ and $-V(IN)$ control voltages and outputs a VCO output signal having an oscillation frequency determined by the $+V(IN)$ and $-V(IN)$ control voltages. The VCO comprises: 1) a storage capacitor charged linearly by a constant charge current and
10 discharged linearly by a constant discharge current; 2) a comparator for comparing the storage capacitor voltage to an upper threshold voltage and a lower threshold voltage. The comparator output drops to a negative saturation voltage ($-V(SAT)$) when the storage capacitor voltage rises above the upper threshold voltage
15 and rises to a positive saturation voltage ($+V(SAT)$) when the storage capacitor voltage drops below the lower threshold voltage.

 The VCO also comprises: 3) a constant charge current source for injecting the constant charge current into the storage capacitor when the comparator output rises to the positive saturation
20 voltage; and 4) a constant discharge current source for draining the constant discharge current from the storage capacitor when the comparator output drops to the negative saturation voltage.